

Platybrotica misionensis a New Genus and Species of Luperini (Coleoptera: Chrysomelidae: Galerucinae) from Argentina

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ABSTRACT A new genus and species of Galerucinae, *Platybrotica misionensis*, is described from northeast Argentina (Misiones Province). This monotypic genus is characterized by the antennomeres 6–10 ventrally excavated, genal space equal to one-fourth to less than one-half of maximum ocular diameter, elytra with 2 posthumeral costae, and internal sac of aedeagus with 5 sclerites, and is assigned to the Diabroticites, a section of the subtribe Diabroticina, tribe Luperini. Adults have been found associated with wild and cultivated Cucurbitaceae.

KEY WORDS *Platybrotica misionensis*, Chrysomelidae, Galerucinae, Diabroticites, systematics

THE PROVINCE OF MISIONES, in the northeastern subtropics of Argentina, has a warm, humid climate (average temperature 20.2–21.1°C; regular rainfalls, annual average 1611–1844 mm) (Estadísticas Climatológicas 1985) that sustains a lush flora, including a three-story rain forest, although deforestation taking place since the 18th century has left large areas of grasslands (Cabrera 1976, Cabrera and Willink 1980). Agriculture in much of the province consists of small, domestic farms, developed amid the forest matrix. In these complex environments, we have found a profusion of Galerucinae, including several new records for Argentina and unidentified (possibly undescribed) species (Cabrera Walsh 2001, 2003, unpublished). Among these, we found an undescribed species with a peculiar antennal morphology. In our long-term research project in southern South America (excluding Chile), involving biology and systematic studies on Diabroticites, such traits warrant our attention.

The Diabroticites comprise 16 valid genera, with its greatest species diversity found in the Neotropical Region (Seeno and Wilcox 1982). Most members of the Diabroticites are distinguished by having filiform antennae in both sexes. However, males of some species possess some antennomeres modified; because of this feature they were assigned to new genera by Bechyné and Springlová de Bechyné (1969). Our specimens are assigned to Diabroticites, which is the major section of the subtribe Diabroticina, tribe Luperini (Wilcox 1965), on the basis of the open anterior coxal cavities, bifid tarsal claws, and the mesotibiae not modified. But the lack of the complete combination of

characters of any of the genera currently known from the Neotropical Region led us to consider the specimens studied in this work as a new genus and species.

This work provides a full description of *Platybrotica misionensis*, the new genus and new species, that allows future recognition of additional specimens. The main diagnostic features are illustrated, and biological data are provided.

Materials and Methods

Adults were collected with aspirators and cucurbitacin-baited cloths (Cabrera Walsh 2001). They were maintained in the laboratory on artificial diet (Campbell and Jackson 1987) and on squash and maize seedlings, to try to obtain eggs and larvae, and to estimate the species host range.

Morphological terminology generally follows Cabrera (1999, 2001). Terminology for hind wing venation follows Lingafelter and Konstantinov (1999), Crowson and Crowson (1996), and Kukalová-Peck and Lawrence (1993). Terminology for mouthparts follows Cabrera and Durante (2001). Terminology for details of epipharynx and labium follows Ball and Shepley (2002). Terminology for metendosternite follows Crowson (1938, 1944), and Konstantinov and Lopatin (1987). Terminology for the parts of male genitalia is based on Lindroth and Palmén (1970) and Mann (1985). Terminology for female genitalia follows Kasap and Crowson (1985), LeSage (1986), and Konstantinov (1998).

Measurements were taken using an eye-piece micrometer on a Wild dissecting microscope (Wild Heerbrugg Instruments, Inc., Farmingdale, New York) at a magnification of $\times 25$. Measurements and abbreviations used in the text are: eye length (eL), determined by the linear distance from anterior to posterior margin of eyes; genal length (GL), distance measured between the anterior margin of eye to the base of mandible; length of pronotum (PL), linear

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distance from anterior to posterior margin measured along the midline; pronotum width (PW), defined as maximum pronotal width; humeral width (HW), maximum width across humeri; elytral length (EL), linear distance from pronotal base to apex of elytra, measured along suture; elytral width (EW), maximum distance across both elytra. Body length was measured from the vertex to apex of elytra. Relative proportions of the above measurements (eL/GL, PW/PL, HW/PW, and EW/HW) were computed.

Drawings were made with camera lucida on a Leitz compound microscope (Lutz-Ferrando, La Plata, Buenos Aires, Argentina) and a Wild dissecting microscope. Electron micrographs of head, antenna, and binding sites of elytra were taken with a Scanning Electron Microscope (SEM) Jeol-JSM-T100. Previously, these structures were mounted on metal studs and coated with gold-palladium.

Features mentioned in the generic description are not repeated in the species description. We provide in this work a diagnosis of the genus comparable to generic taxa definitions for *Diabroticites* used by chrysomelid specialists (Bechyné and Springlová de Bechyné 1969, Seeno and Wilcox 1982). Recently, however, Lingafelter and Konstantinov (1999) brought attention to structures of *Alticinae*/*Galerucinae* that have not yet received extensive use in the chrysomelid literature. Features like mouthparts, hind wing venation, metendosternite, and elytral binding sites are employed in this study for the first time for *Diabroticites*. Details of male genitalia are also analyzed. These new features were characterized only in the specific description, because we are not able to establish which of them are likely to be characteristic of the generic level.

The holotype, allotype, and a number of paratypes are deposited in the collection of the Museo de La Plata (MLP), La Plata, Buenos Aires Province, Argentina. Type label includes the species name, the type status and gender, and authors.

Platybrotica, New Genus

Type Species. *P. misionensis* Cabrera & Cabrera Walsh, by current designation and monotypy.

Diagnosis. This genus can be separated from other members of the *Diabroticites* by the following combination: genal space small, but equal to 3 or more of maximum eye diameter; antennomeres 6–10 of the male ventrally excavated; elytra with 2 posthumeral costae; internal sac of aedeagus with 4 sclerites, 2 of them toothed on the lateral and apical margins.

Head. Antennal calli well delimited; supracallinal sulcus distinct; orbital sulcus absent. Frontal and anterofrontal ridges well developed. Antennae 11 segmented, inserted below midline of eyes. Male antennae with antennomeres 2 and 3 about equal in length and width, scarcely setose, together approximately: length of antennomere 4; antennomeres 6–10 thicker than remaining antennomeres, ventrally excavate. Eyes moderately convex, close to mandibular base. Genal space small, equal to one-fourth to less than one-half of maximum ocular diameter. Labrum dor-

sally with a row of 6 setae at midlength. Mandibles symmetrical, pyramidal, 5-toothed apically; setose membrane, mola, and prosthecal fringe well developed. Maxillae with lacinia and galea well developed, with fringe-like pilosity apically; lacinia 1 segmented, shorter than galea; galea 2 segmented; maxillary palpi, 4 segmented, palpomere 4 with a digitiform sensillum patch on outer-basal margin. Female antennae filiform, antennomere 2 shorter than 3, antennomeres 5–10 subcylindrical. Postmentum and prementum well developed, ligula membranous, scarcely developed, not bilobed; lateral areas covered with fine, dense pilosity. Labial palpi 3 segmented.

Thorax. Pronotum slightly convex, narrower than elytra; anterolateral and posterolateral angles rounded, with one long seta on each angle. Procoxal cavities open, contiguous; intercoxal prosternal process poorly developed, extending between procoxae. Mesonotum and scutellum fused. Metendosternite with stalk and ventral apodeme present; meso-metacuticular tendons not widely separated. Hind wings with veins radius (R), posterior radius (RP), posterior media (MP), and anal cubitus (CuA) well sclerotized; veins subcosta (Sc), posterior anal (AP), and anterior anal (AA) scarcely sclerotized; radial cell, cubital cell, and anal cell 1 present. Elytra oval, each with one posthumeral costa weak, but distinct, extending along side from humeral callus to two length of elytron; epipleura normal, proximally narrowed; male with an oval binding patch covered with spicules. All legs similar; femora of all legs fusiform; tibiae dorsally carinate; mesotibiae not modified; meso- and metatibiae of males with tibial spurs; pro- and mesotarsomeres one of males with ventral adhesive patch; tarsomeres one of metalegs long, as long as two following tarsomeres combined; tarsal claws bifid.

Abdomen. Five segmented; sternite five subrectangular, apically broadly emarginated in males, rounded in females.

Male Genitalia. Median lobe symmetrical, without basal spurs; orificial plate well developed; basal orifice broad, and internal sac of median lobe with four sclerotized sclerites.

Female Genitalia. Vagina + bursa copulatrix not divided, with a complicated sclerotized area. Receptacle of spermatheca scarcely distinct from pump, with an apical hook.

Etymology. This new genus owes its name to the flattened shape of the male antennae

Remarks and Comparative Notes. *Platybrotica* is included within the *Diabroticites* and shares with the genera *Buckibrotica* Bechyné and Springlová de Bechyné (1969), *Cornubrotica* Bechyné and Springlová de Bechyné (1969), and *Anisobrotica* Bechyné and Springlová de Bechyné (1969) the presence of ventrally excavated antennomeres in the males. Of these genera, *Buckibrotica* is also recognized for having antennomeres 7 and 9 (or only 9) wider than the remaining antennomeres, and somewhat pointed on one side. *Cornubrotica* has antennomeres 8 and 9 excavated, but it also possesses mesotibiae and femora

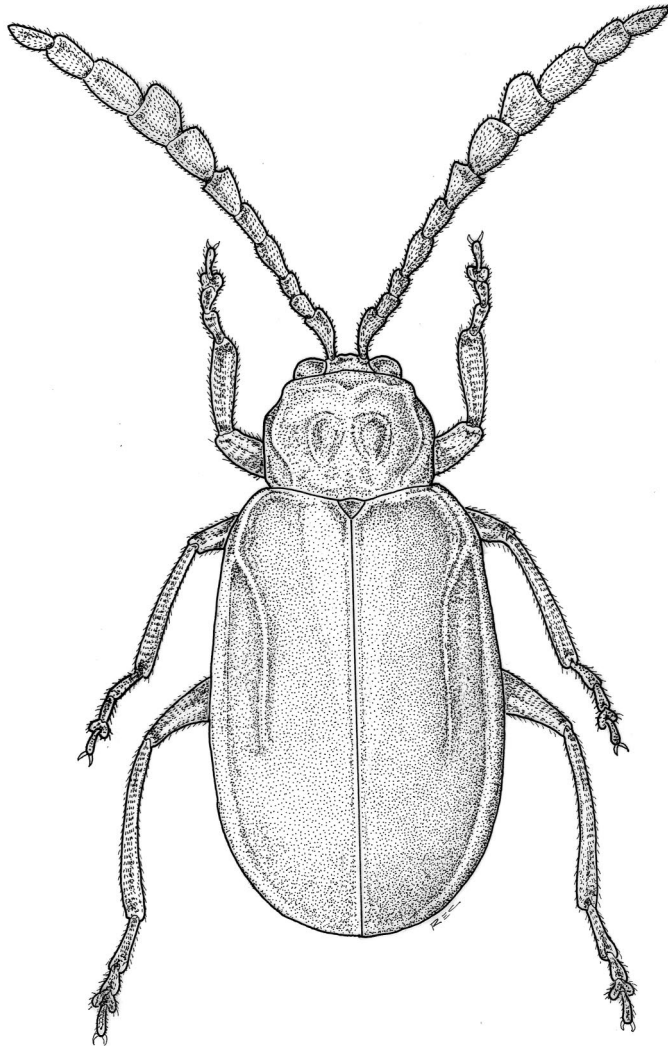


Fig. 1. *P. misionensis* Cabrera & Cabrera Walsh, male, dorsal habitus.

modified as a clasper organ. Males of *Anisobrotica* have antennomeres 9–11 dilated apically.

The Phyllecthrites, another section of the subtribe Diabroticina, display males with modified antennomeres. However, they also have appendiculate tarsal claws and excavated mesotibiae.

New features presented in this work may be useful characters for phylogenetic analysis, and their distribution in the Diabroticites should be investigated further. The phylogenetic position of this taxon will be treated in a forthcoming paper on cladistic relationships among genera of the Diabroticites (N.C., unpublished).

P. misionensis Cabrera & Cabrera Walsh,
New Species
(Figs. 1–5)

Male. (Fig. 1) Body oval to elongate, slightly convex; length 4.41 mm; width 2.30 mm.

Color. Frons, antennal calli, and mouthparts straw yellow; vertex amber tinged with green. Labrum and apical margin of mandibles chestnut to piceous. Antennae piceous, inner surface, and apex of antennomeres 1–3 tinged with chestnut. Pronotum lime green, tinged with yellow anteriorly. Scutellum piceous. Elytra amber; humeral vitta, lateral margins, and elytropleura lime green. Coxae and basal half of femora straw yellow; distal half of femora lime green; tibiae and tarsi dark chestnut. Venter with prosternum, mesosternum, and abdomen lime green, with metasternum dark chestnut to piceous.

Head. (Fig. 2A) Vertex finely and inconspicuously punctate, deeply depressed above antennal calli; antennal calli subtriangular, higher than vertex, wider than antennal sockets, surface moderately shiny, smooth; supracallinal sulcus deeply impressed; antennal sockets close to anterior margin of eyes, distance between them less than half of transverse ocular di-

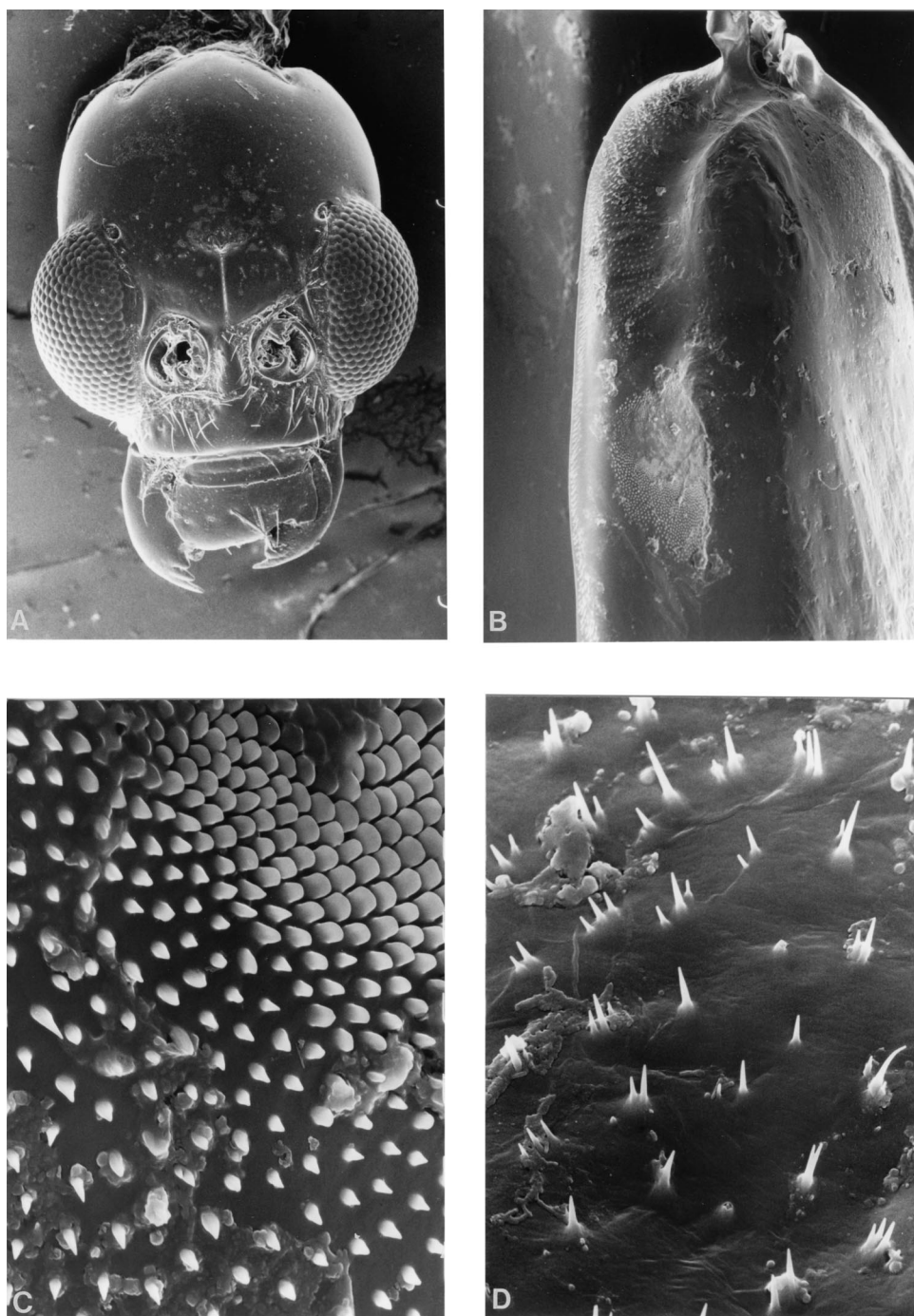


Fig. 2. *P. misionensis*. (A) Head, frontal view. (B) Binding patch, ventral view of elytron. (C) Detail of binding patch basal area with rounded spicules and distal area with sparse triangular spicules. (D) Detail of basal angle of elytron with bi-tridentate spicules. Scale bars = A, B: 100 μ m; C, D: 10 μ m.

ameter. Frontal ridge moderately raised, convex in lateral view, extending between antennal calli, wider toward anterior margin of eyes; anterofrontal ridge thin, and as high as frontal ridge in lateral view, with approximately 6 setae laterad to frontal ridge, and

8–10 long setae below antennal sockets and genae. Antennae (Fig. 3A) 11 segmented, extending to about half length of elytra; antennomere 2 short, subequal to 3, together 0.8 times length of antennomere 4; antennomeres 3–6 progressing from elongate to distally

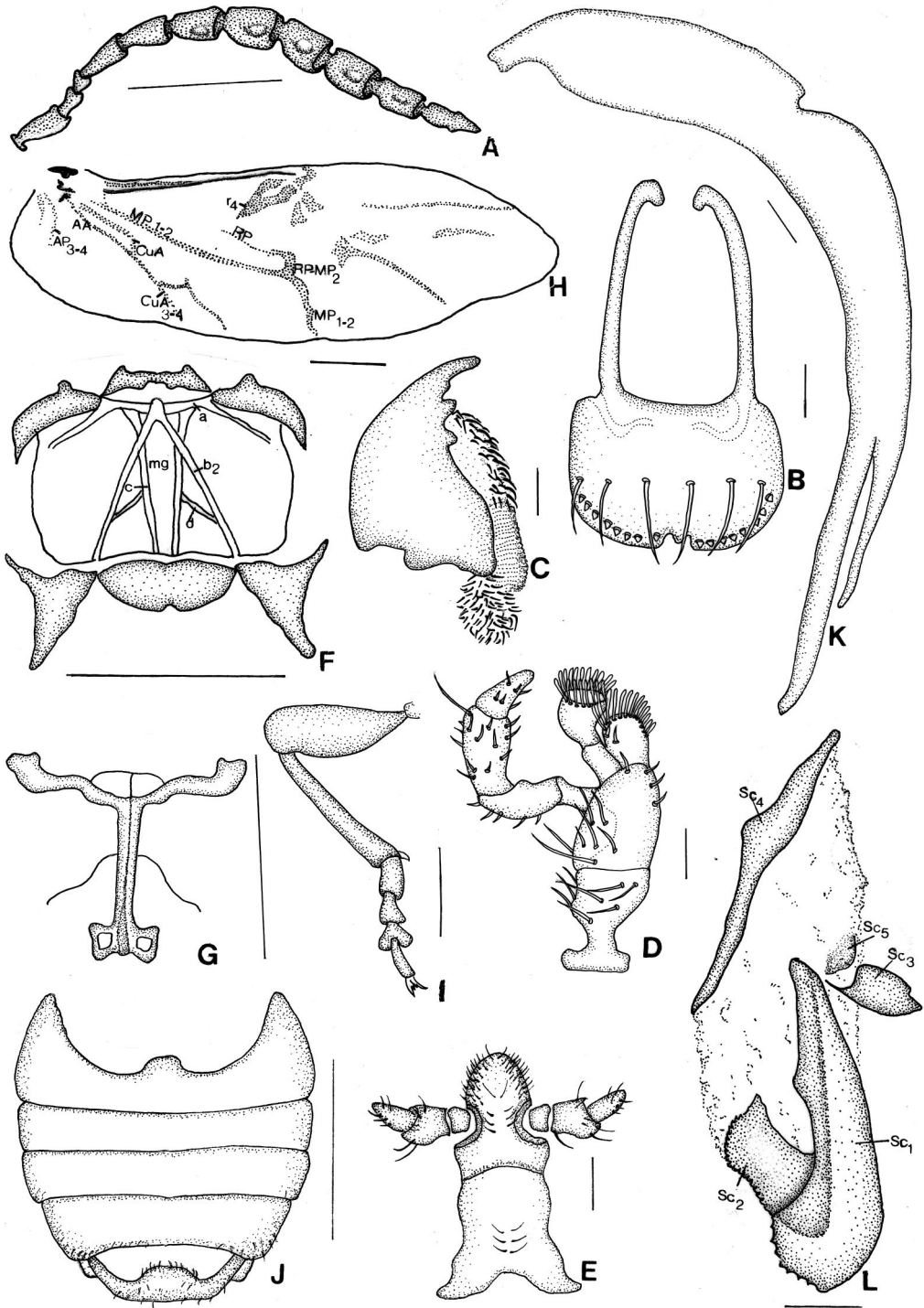


Fig. 3. *P. misionensis*, male. (A) Antenna, ventral view. (B) Labrum, dorsal view. (C) Mandible, external face. (D) Maxilla, ventral view. (E) Labium, ventral view. (F) Metanotum. (G) Metendosternite. (H) Hind wing. (I) Mesoleg, detail of apical spur. (J) Abdomen, ventral view. (K) Median lobe, lateral view. (L) Internal sac of median lobe. Scale bars = A, F-J: 1 mm; B-E, K-L: 0.1 mm.

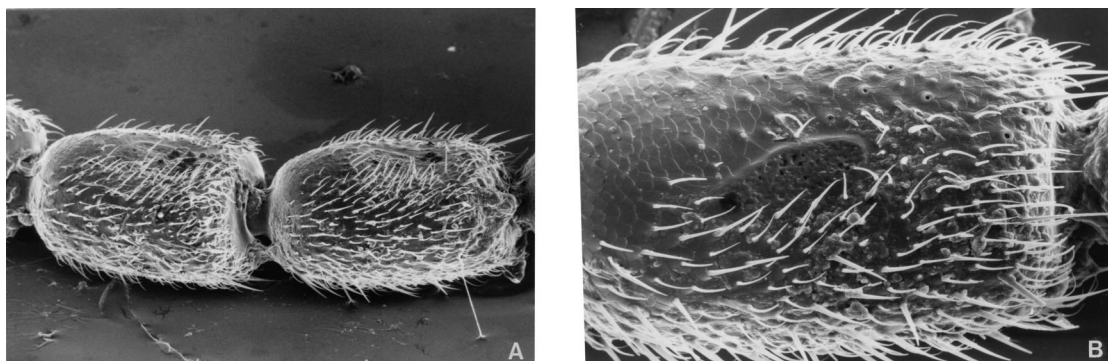


Fig. 4. *P. misionensis*. (A) Antennomeres 8-9, latero-ventral view. (B) Detail of antennomere 9. Scale bars = 100 μ m.

expanded; antennomeres 7-9 distinctly thicker than other antennomeres; antennomere 10 slenderer than 7-9, more or less parallel sided; antennomere 11 apically acuminate. Antennomeres 1-3 scarcely setose; antennomeres 4-11 densely setose throughout, with long erect setae on apical margin; antennomeres 6-10 (Fig. 4, A and B) ventrally excavated and glabrous, densely setose around excavated area. Maximum diameter of eye (eL) 0.49 mm; a long supraorbital seta present; inner margin with numerous small setae. Genal space (GL) 0.09 mm, more than one-fourth maximum length of eye; GL/eL 0.18. Labrum (Fig. 3B) transverse, approximately rectangular; anterior margin with a central notch; lateral margins slightly rounded; a row of 6 long setae present at midlength, apically with 3 short setae at each side of notch. Epipharynx with pedium long, slender, with short pedial setae; lateral surface with microtrichia and ≈ 20 short, thick setae on apical margin. Mandibles (Fig. 3C) narrow, sparsely, weakly setose, with only teeth 3-5 visible on external face; tooth 3 narrow, acute, almost 3.0 times length of tooth 4; inner margin of tooth 3 smooth; tooth 3 narrow, acute, almost 3.0 times length of tooth 4, inner margin of tooth 3 smooth; tooth 4 slightly acute; tooth 5 blunt at apex; inner mandibular margin smooth; setose membrane extending from inner surface of mandible to above mola; mola longer than wide, sculptured with rows of fine grinding ridges; prosthecal fringe formed by long setae. Maxillae (Fig. 3D) with cardo apically broadened, with 6 long setae centrally and 4 setae on outer margin; basistipes smooth with 7 long setae; inner-lateral margin of dististipes finely striate, with 3 small setae in inner margin and 2 setae close to lacinia; lacinia shorter than galea; galea subcylindrical, apically wider than base. Maxillary palpi well developed, 4 segmented, surpassing galea; palpomere 1 slightly longer than wide; palpomere 2 subcylindrical, finely setose; palpomere 3 longer than palpomere 4, densely setose; palpomere 4 subconical, strongly tapering apically, digitiform sensillum patch present in externo-basal corner of palpomere 4, evident with higher resolution. Labium (Fig. 3E) with postmentum subtrapezoidal; 6 setae concentrated in midline. Prementum subrectangular,

with 6 long setae situated between bases of palps. Ligula globose bearing 6 setae (4Ds-2Cs). Bases of palps separated from each other. Labial palp with palpomeres 1 and 2 subcuadrate, palpomere 1 one-half length of palpomeres 2 and 3, palpomere 3 subconical.

Thorax. Pronotum subrectangular, 1.05 times wider than long, widest near middle, PW 1.25 mm; bifoveate, shiny, evenly, finely punctate; anterior and posterior margins almost straight; lateral margins slightly expanded anteriorly; one long, thin seta on each anterior lateral and posterior lateral angle. Prosternum transverse, convex; procoxal cavities inserted at middle, contiguous; intercoxal prosternal process thin, extending between procoxae to about one-third coxal length. Mesonotum and scutellum fused; scutellum triangular, smooth, rounded at apex. Mesosternum nearly as long as metasternum at midline, slightly convex, intercoxal mesoesternal process thin; mesocoxal cavities inserted at posterior margin, nearly contiguous, broadly open laterally to mesepimeron. Metanotum transverse, wider than long; metanotal ridge d (Fig. 3F) intersecting c at midpoint of c ; bridge b_1 intersecting a below median groove. Metasternum transverse, slightly concave centrally, deeply depressed laterally, with a small bidentate projection between inner margin of metacoxae, sparsely setose centrally, with setae longer than pro-mesosternum; lateral half of metasternum, metepisternum, and metepimeron densely setose; metacoxal cavities inserted at posterior margin, narrowly separated. Metendosternite (Fig. 3G) with stalk longer than wide; lateral arms obtusely divergent, apically flattened; mesofurcal-metafurcal tendons poorly developed, inserted at middle of lateral arms; ventral process poorly developed. Hind wings (Fig. 3H) with Sc connected to R at about half its length, with radial cell darkly pigmented, triangular; RP-MP₂ not reaching r₄; MP₃₊₄ absent; CuA₂ attached to CuA at nearly midlength; cubital anal cell 1 closed, elongate; cubital anal cell 2 absent; AA unbranched and connected to CuA₃₊₄ at about half distance from origin of CuA; AP₃₊₄ short, scarcely sclerotized, having apical field with veins RP difficult to distinguish. Elytra slightly wider than pronotum; HW/PW 1.28, greatest width near posterior one-thirds of elytra;

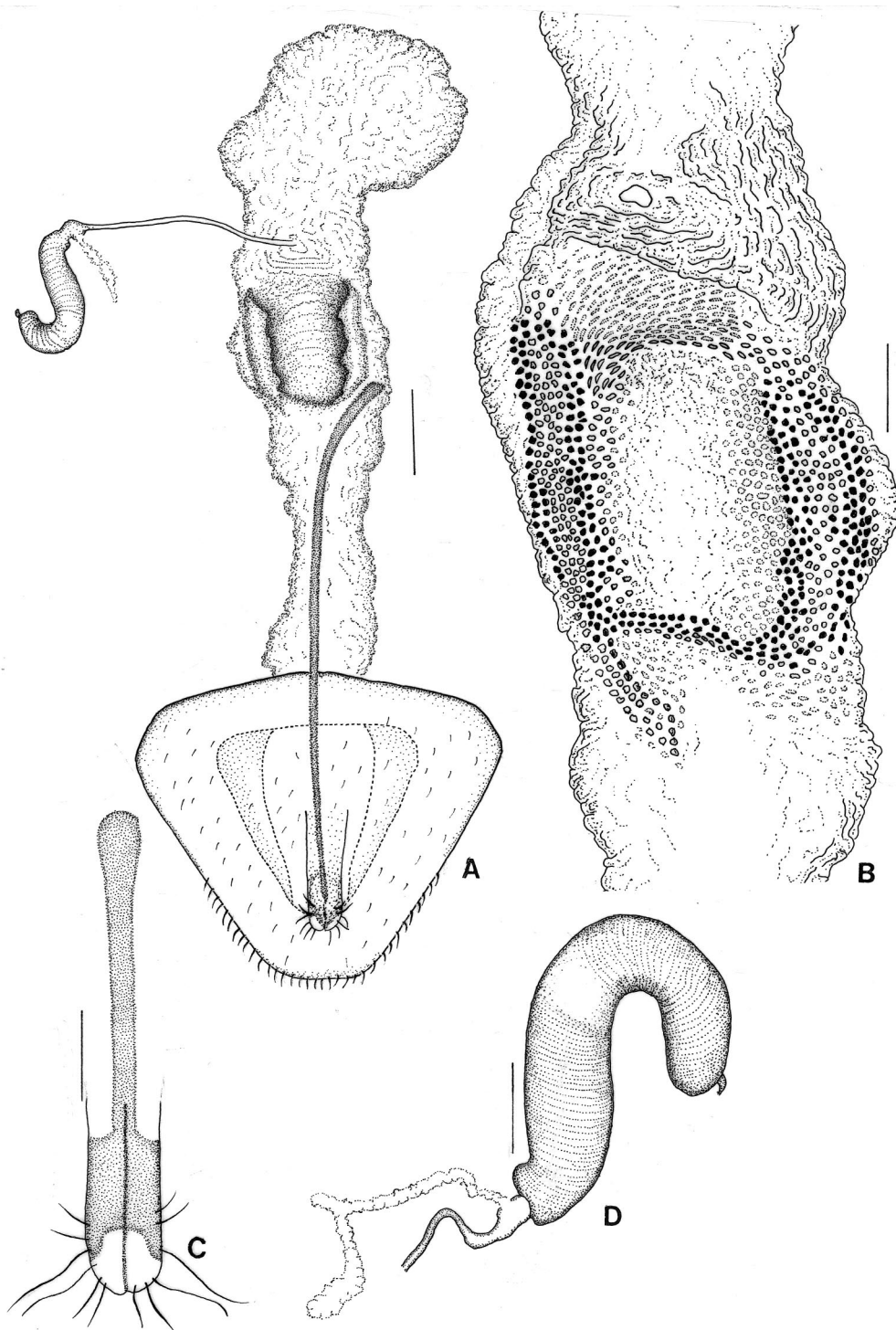


Fig. 5. *P. misionensis*, female: (A) genitalia; (B) detail of vagina; (C) styles; (D) spermatheca. Scale bars = 0.1 mm.

EW/HW 1.43; humeral calli rounded, slightly prominent; dorsal surface finely, densely punctate, with punctures coarser than on pronotum; 2-costate, outer costa extending from humeral callus to basal one-half

length of elytron; inner, shorter, extending to basal one-third of elytron; epipleura anteriorly broad, gradually narrowed along apical half; inner surface of elytra with a single binding patch (Fig. 2, B and C)

covered with rounded spicules on basal half, apical half seeming bare under low magnification, but with small sparse triangular spicules under higher magnification; surface near basal angle covered with small spicules, bidentate or tridentate (Fig. 2D). Legs with metatibiae longer and slenderer than pro- and mesotibiae, apical margin of meso- and metatibiae with short tibial spurs; trochanters and femora sparsely setose; meso- and metatibiae densely setose ventrolaterally; tarsomeres setose dorsally with long erect setae; pro- and mesolegs (Fig. 3I) with a ventral adhesive patch covering; length of protarsus; tarsomere one of pro- and mesolegs shorter than tarsomeres 2 + 3 together; tarsomere 1 of metalegs long and slender, as long as tarsomeres 2 + 3 together; tarsal claws bifid, inner claw about as long as outer.

Abdomen. (Fig. 3J) Sternite 5, 1.5 times length of 4, slightly emarginate apically.

Genitalia. Aedeagus, pale at basal one-third, and darker apically. Median lobe (Fig. 3K) evenly curved in lateral view, slightly constricted at about basal one-third of median lobe in dorsal view; anteriorly slender, about two-thirds length of median lobe, tapering slightly toward apex, scarcely deflexed, apically with a small projection; orificial plate narrowed apically, acute at apex; basal orifice broad, extending in a longitudinal groove; ostium enlarged, with a pair of triangular lobes attached to sides. Internal sac of median lobe (Fig. 3L) with 5 sclerites; sclerite 1 rounded apically, toothed from lateral inflection; sclerite 2 subtriangular, broad apically, finely toothed on apical and lateral margins, abruptly narrowed to form a long arm; sclerite 3 short, broad, bearing an apical, acute tooth; sclerite 4 narrow, elongate, pointed basally, with a triangular medial expansion; sclerite 5 very small, less sclerous than rest, except at tip.

Female. Length 4.75 mm, width 2.57 mm. The sole specimen studied is similar in color and morphology to the male, except for the features of antennae, apical spurs of tibiae, and adhesive patch of tarsi. Antennomere 2 (A2 0.16 mm) shorter than antennomere 3 (A3 0.19 mm), together 1.06 length of antennomere 4. Maximum ocular diameter (eL 0.59 mm); genal space (GL 0.13 mm) approximately one-fourth of ocular length; GL/el 0.22. Pronotum 1.17 times wider than long; PW 1.32 mm. Elytra wider than pronotum; HW/PW 1.44, EW/HW 1.34.

Genitalia. (Fig. 5A) Sternite 8 weakly sclerotized; apodeme (tignum) slender, slightly curved posteriorly. Styles (vaginal palpi) (Fig. 5C) slender, subcylindrical, rounded at apex with 10 long setae. Vagina + bursa copulatrix large, with middle area sclerotized (Fig. 5B). Spermathecal duct (Fig. 5D) with a short sclerotized portion inserted basally; receptacle apically elongate, uncoiled; spermathecal gland elongate. Receptacle of spermatheca subcylindrical in shape, elongate, not well distinguished from pump; pump curved, with a small pointed appendage at apex.

Variability of Paratypes. The other specimens attributed to this species are similar to the holotype. However, some color variations have been observed in several specimens. In some specimens, head, legs, and

ventral surface are yellowish chestnut (except the metathorax, which is black), and the elytra are yellowish chestnut with external border light green. Others show completely amber elytra, with a thin yellow outer band, and yellowish pronotum. Yet others have a mostly lime green head, except for mouth parts and antennae. Some specimens with antennomeres 7–9 with ventral reddish patches.

Length 4.08–5.17 mm (\bar{x} = 4.67 mm, n : 20), width 1.90–2.77 mm (\bar{x} = 2.40 mm). Antennomeres 2–4: 0.69–1.34 mm (\bar{x} = 1.00 mm); eyes with eL 0.39–0.62 mm (\bar{x} = 0.47 mm), GL: 0.09–0.19 mm (\bar{x} = 0.13 mm), GL/el: 0.18–0.36 mm (\bar{x} = 0.24 mm). Pronotum subquadrate to slightly subrectangular 0.94–1.33 mm (\bar{x} = 1.11 mm) times wider than long; PW 1.12–1.55 mm (\bar{x} = 1.62 mm). Elytra wider than pronotum; EW/HW 1.09–1.43 mm (\bar{x} = 1.34 mm).

Type Material. HOLOTYPE: male, ARGENTINA: Misiones, Capióví, 11-IV-2000, on *Sicyos polyacanthus* Cogniaux (Cucurbitaceae), Cabrera Walsh col. ALLOTYPE: female, Misiones, Gob. Roca, 2-VI-2002, on squash, *Cucurbita maxima* Duchesne, Cabrera Walsh col. Paratypes (141): same data as holotype. All material deposited in MLP.

Etymology. The name of this new species refers to where it was first found, Misiones Province.

Biological Notes. Of the 143 specimens of *P. misionensis* collected, only 1 was a female. Furthermore, 114 of them were captured on cucurbitacin baits, 27 feeding on cucurbits, and 2 on corn silks. This suggests the males are attracted to cucurbits more than females, a feature consistently observed with many Diabroticina (Cabrera Walsh and Cabrera (2003)), and the females are likely to be found on other, yet undetermined hosts. Larval host plants are also unknown, as are the immature stages. This species was collected during fall and early winter.

Distribution. This species is currently known only from southwestern Misiones Province, in the Paranense biogeographic province, as defined by the scheme proposed by Cabrera and Willink (1980), or Parana Forest province *sensu* Morrone (2001).

Acknowledgments

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